

**Navigation Improvement Study on  
the  
Upper Mississippi River Near  
Savanna Bay, Pool 13**

**Sedimentation and Hydrodynamic  
Investigation**

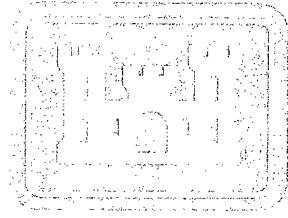
**Volume 2 of 2**

*Mar 98*

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**US Army Corps  
of Engineers**

ILLINOIS  
Carroll County

2 298 000 E

Mississippi Palisades State Park



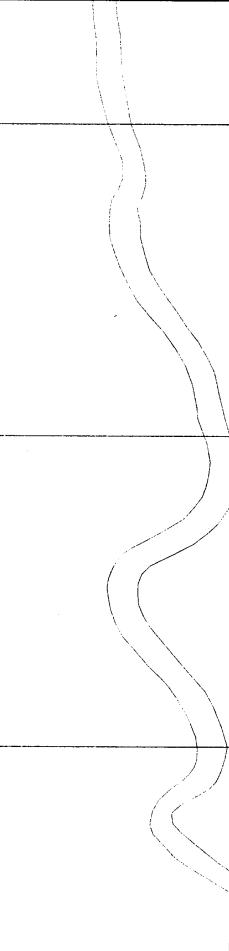
IOWA  
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Savanna Bay

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Dike 539.2R



Sabula Slough

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EL 10  
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ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS  
SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
1996 PROTOTYPE SURVEY  
800 400 0 800 FT  
Scale: 1:62,500  
Date: May 1996  
20.

ILLINOIS  
Carroll County

Savanna Bay

Santa Fe Island

1988 000 N

Dike 540.9R

1986 000 N

Dike 540.8R

Dike 540.7R

Riprap Island

Island 266

Sweeney Islands

Dike 539.2R

Sabula Slough

IOWA  
Jackson County

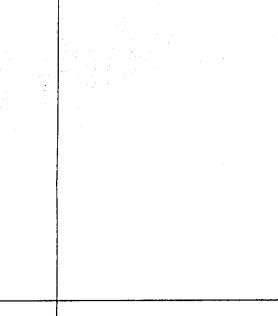
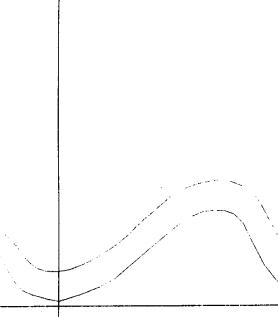
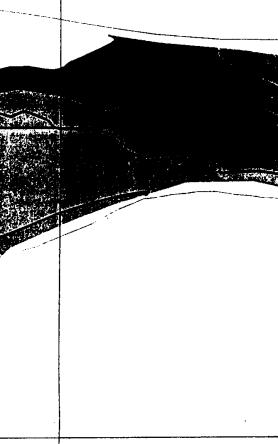
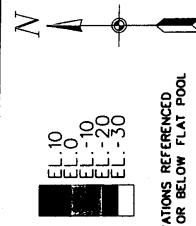
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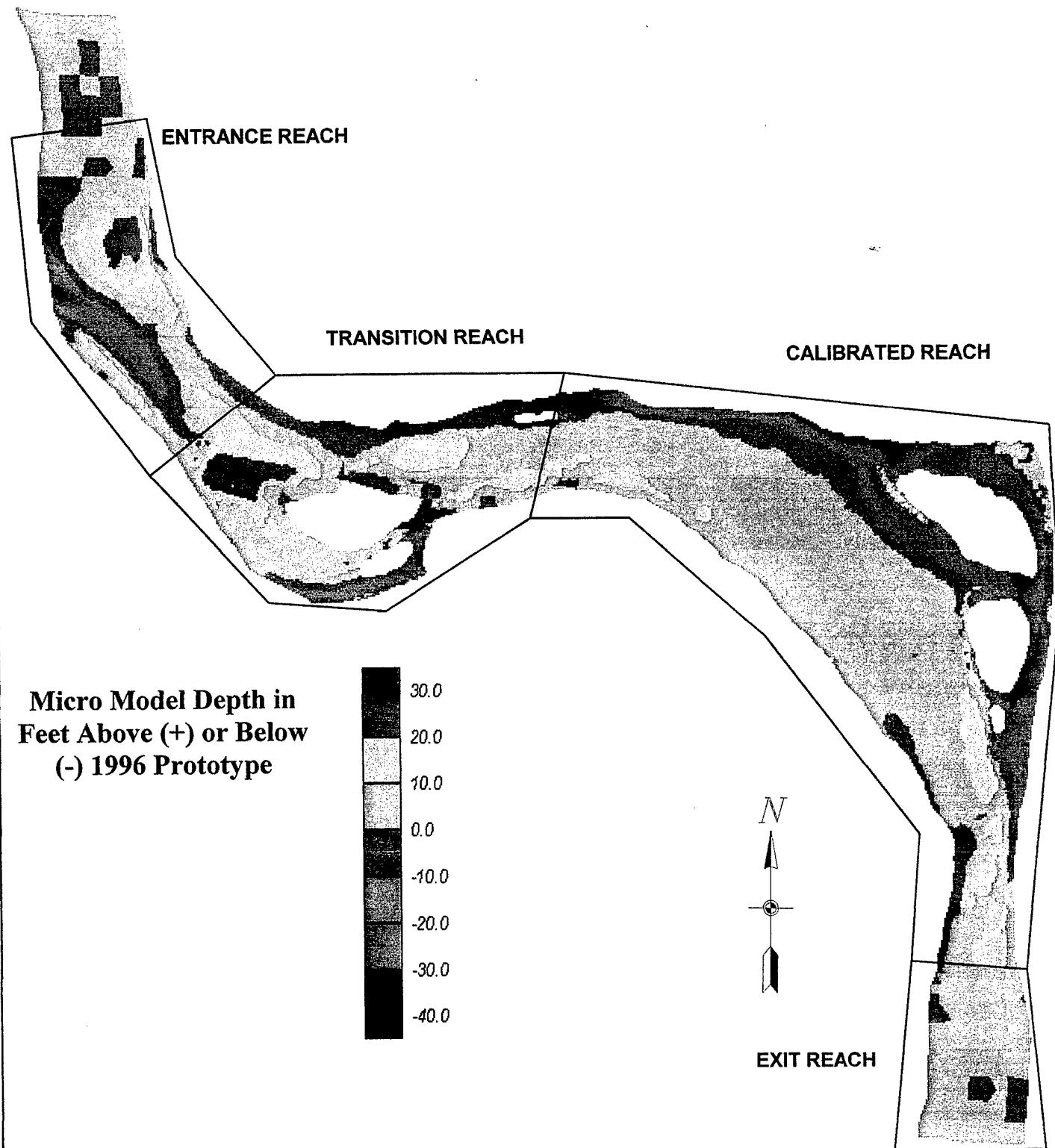
1984 000 N



U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
COAST OF ENGINEERS  
ROCK ISLAND, ILLINOIS  
SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 542-537  
BASE TEST  
800 400 0 800 FT  
800 400 0 800 FT  
DESIGN DATE: Savanna Bay  
PLATE NO. 21  
PREPARED BY: C. WAMES  
BY: R. DAWBER  
PRINTED: 1984

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

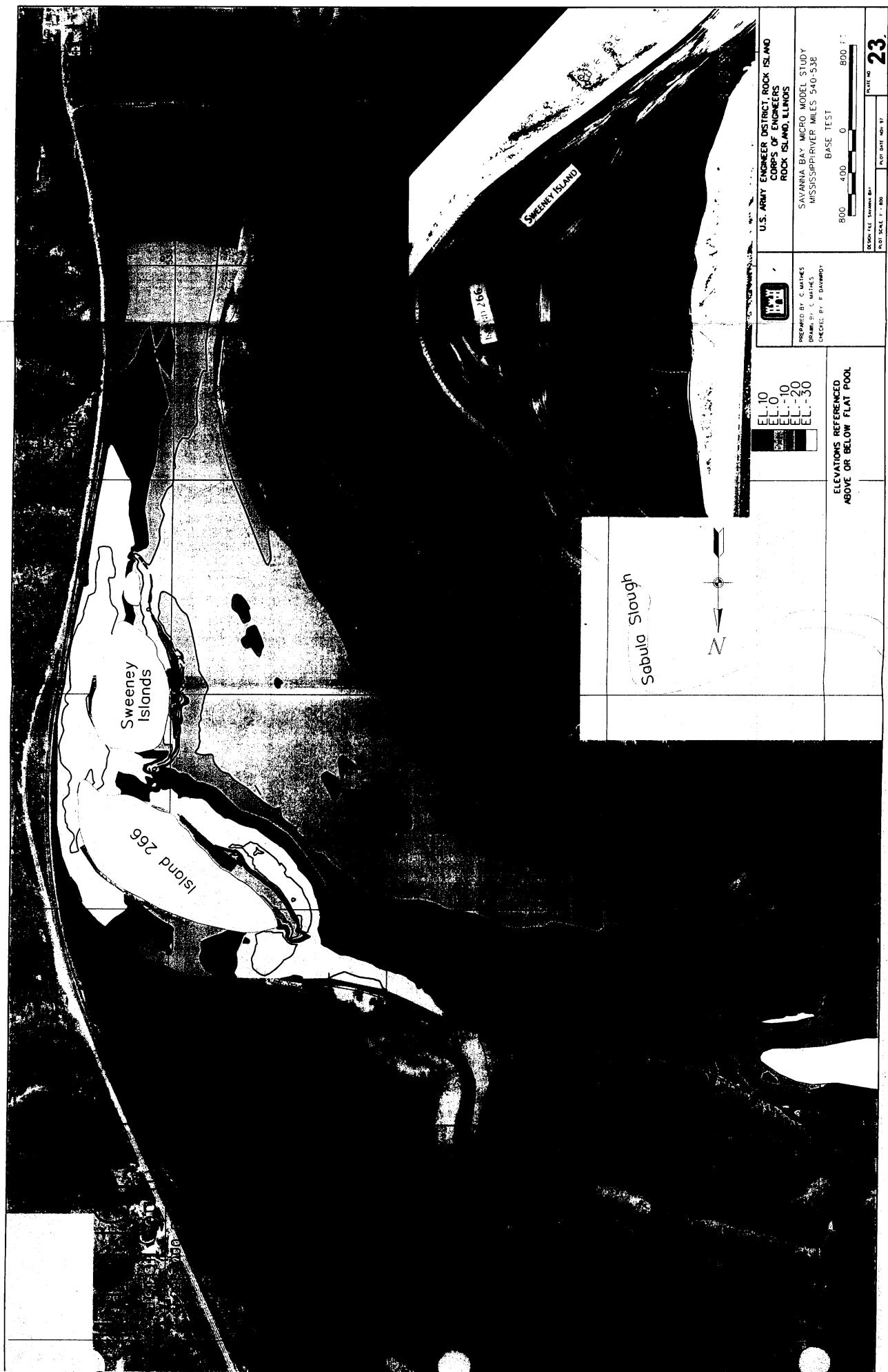




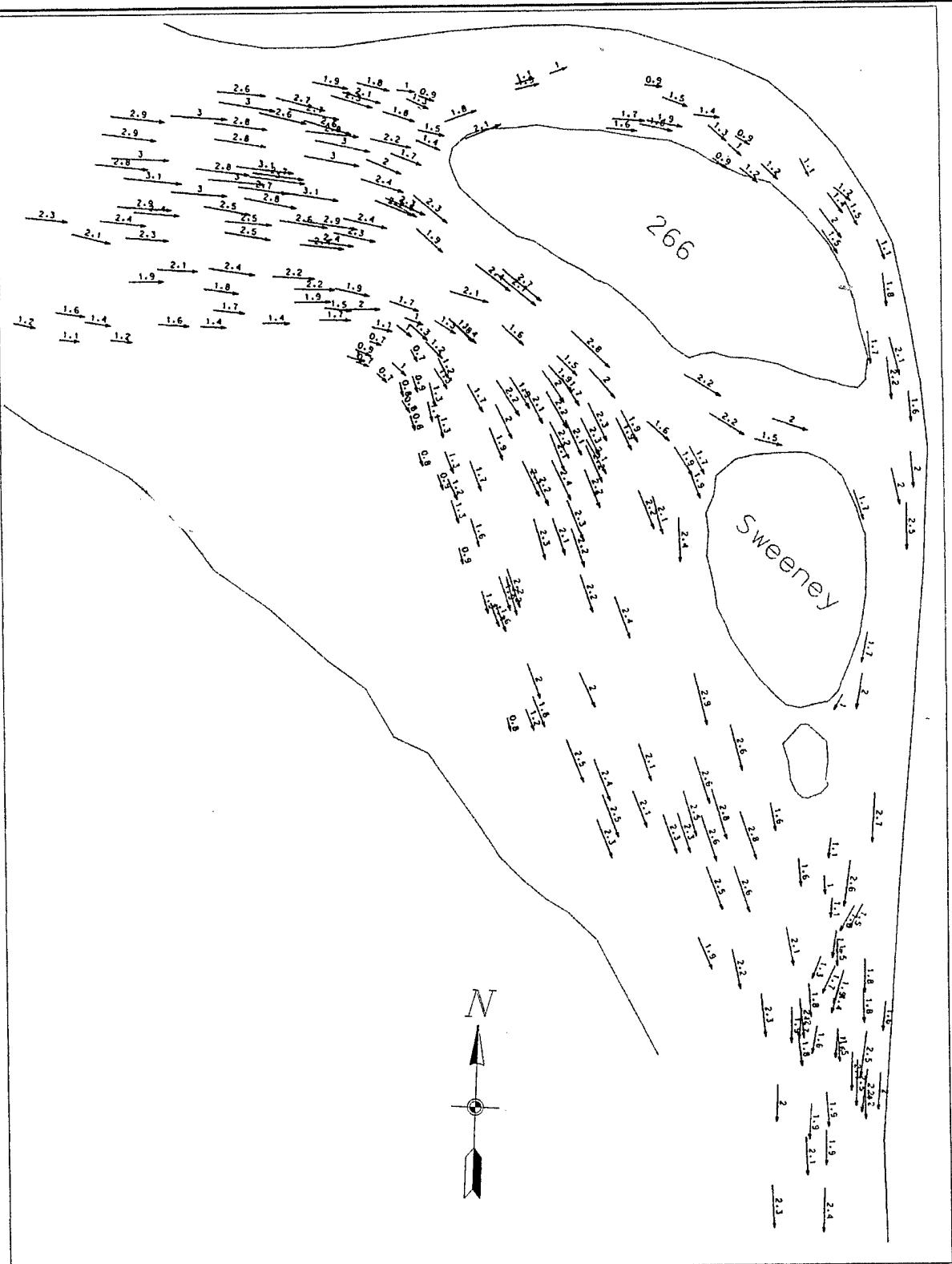
 <small>PREPARED BY: T. Krikeng CHECKED BY: R. Devroy</small>	<b>U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS</b>
	<b>Navigation Improvement Study of the Upper Mississippi River Near Savanna Bay, Pool 13</b> <u>Comparison of Prototype Bathymetry Versus Micro Model Bathymetry</u>

PLATE NO.

**22**



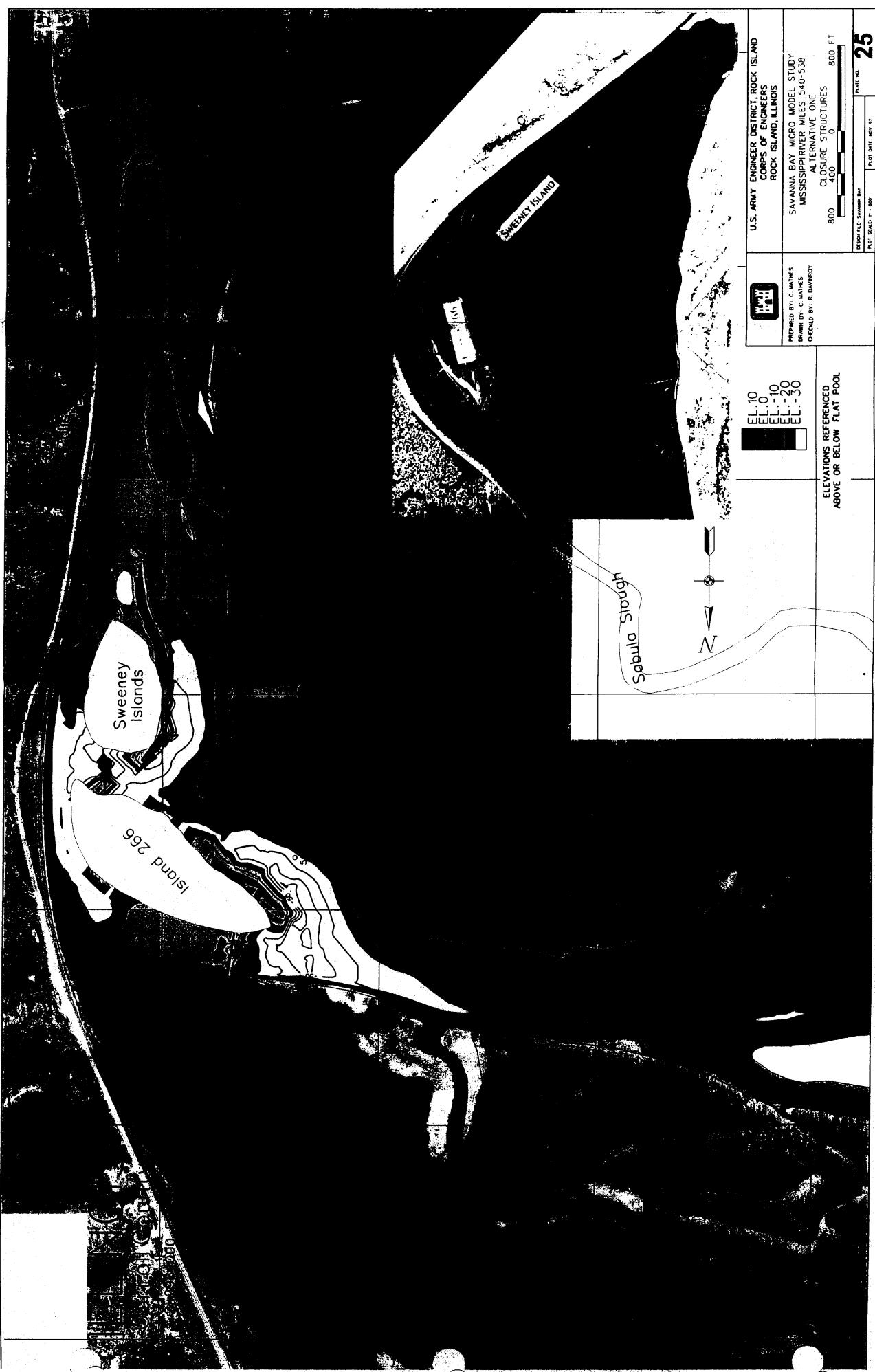
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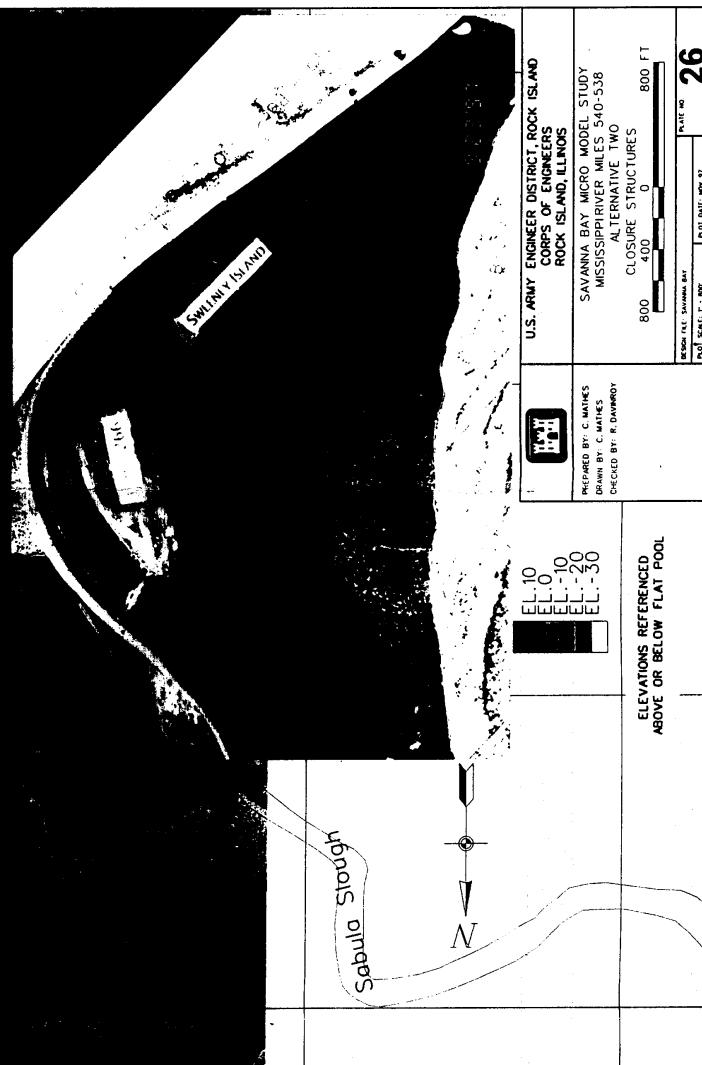


 PREPARED BY: C. Mathes CHECKED BY: R. Davinroy	U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS
	Navigation Improvement Study of the Upper Mississippi River Near Savanna Bay, Pool 13  <u>Base Test</u> <u>Micro Model Flow Visualization Velocity Diagram</u>

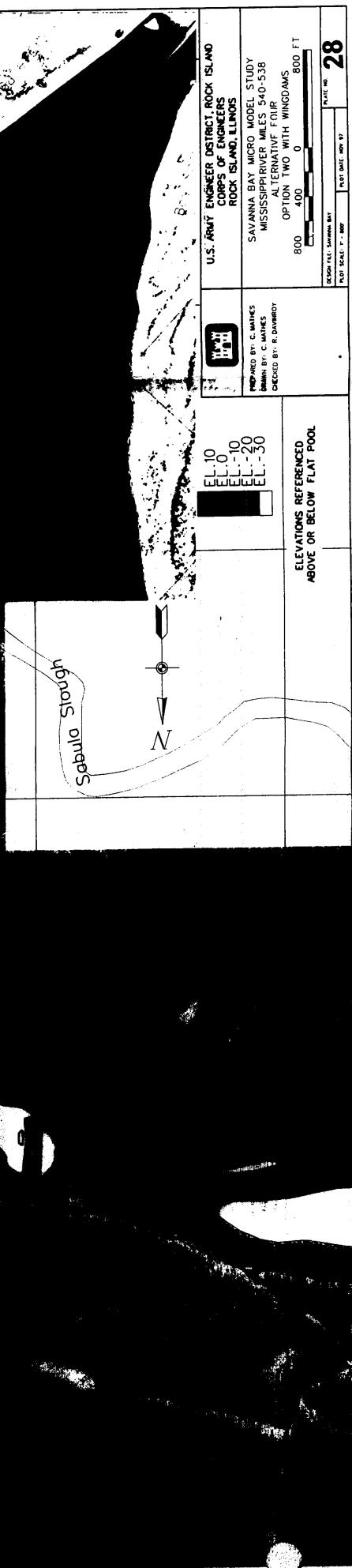
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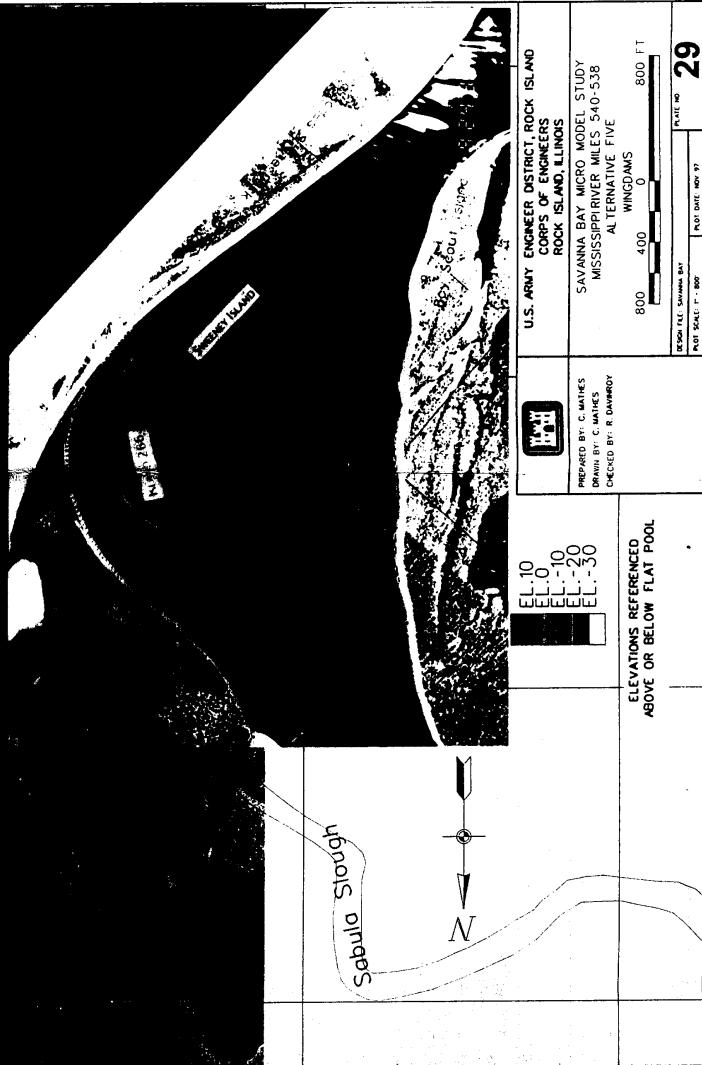
24















U.S. ARMY ENGINEER DISTRICT ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

SAVANNA BAY, MICRO MODEL STUDY  
MISSISSIPPI RIVER, MILES 540-538  
ALTERNATIVE SEVEN  
STUB DIKE OFF PERLEVEMENT  
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Sweeney  
Islands

Island 266

Sweeney Island

Seabula Slough

N

U.S. ARMY ENGINEER DISTRICT ROCK ISLAND	
CORPS OF ENGINEERS	
ROCK ISLAND, ILLINOIS	
SAVANNA BAY MICRO MODEL STUDY	
MISSISSIPPI RIVER MILES 540-538	
ALTERNATIVE EIGHT	
THREE BAR DIKES	
EL-10	800
EL-0	400
EL-10	0
EL-20	0
EL-30	0
ELEVATIONS REFERENCED ABOVE OR BELOW FLAT POOL	

MAP NO. SAVANNA BAY 1:10000

PLAT SCALE 1:10000

PLAT DATE MAY 97

PLAT NO. 32

DATE NO.



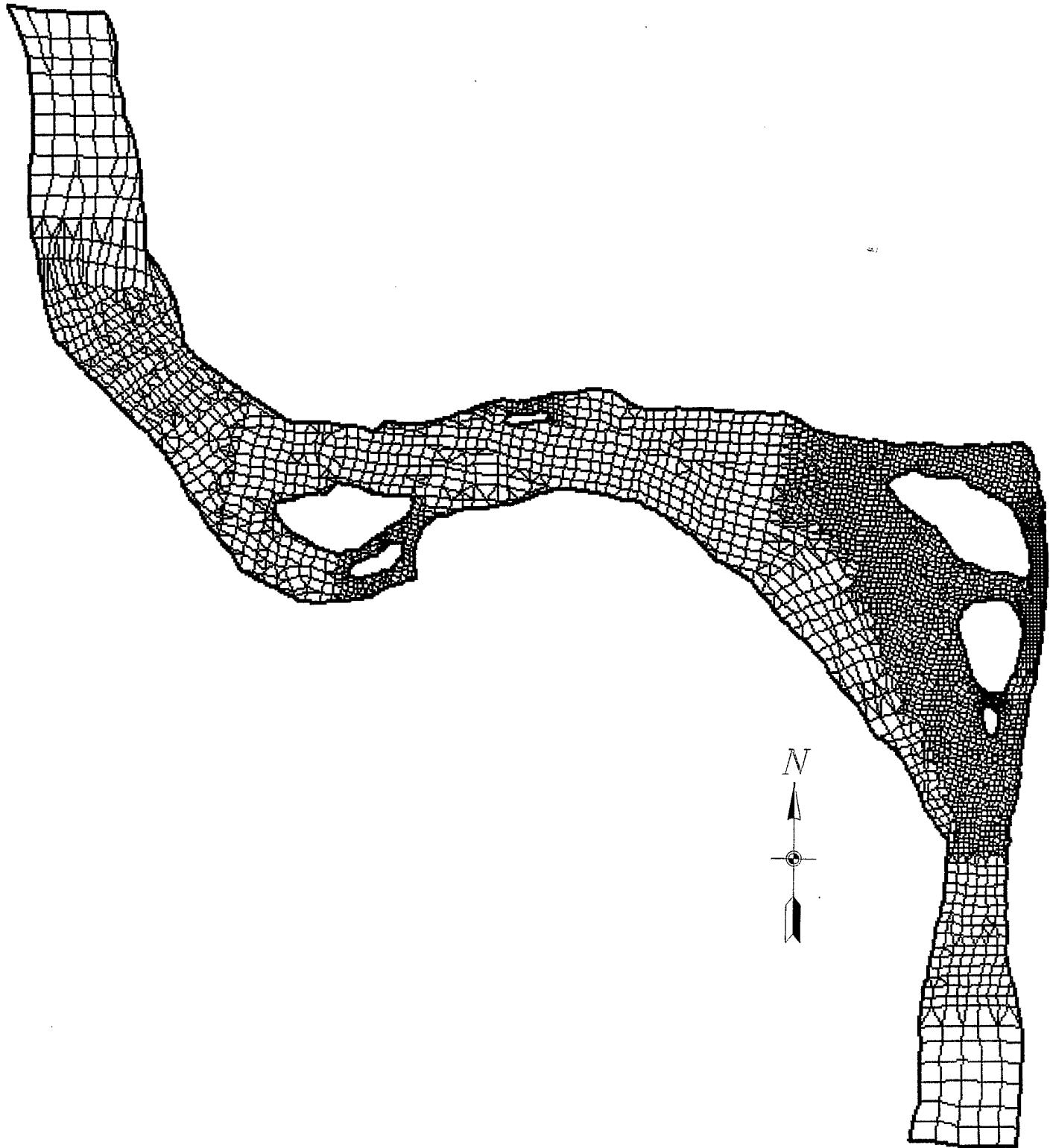
U.S. ARMY ENGINEER DISTRICT ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
THREE ALTERNATIVE, NINE  
STRUCTURES  
800 400 0 200 FT

DESIGN EEL. SAVANNA BAY  
1:12,500  
1:38,000  
PLATE NO. 33  
DATE MAY 97  
PLOT SCALE 1" = 800 FT

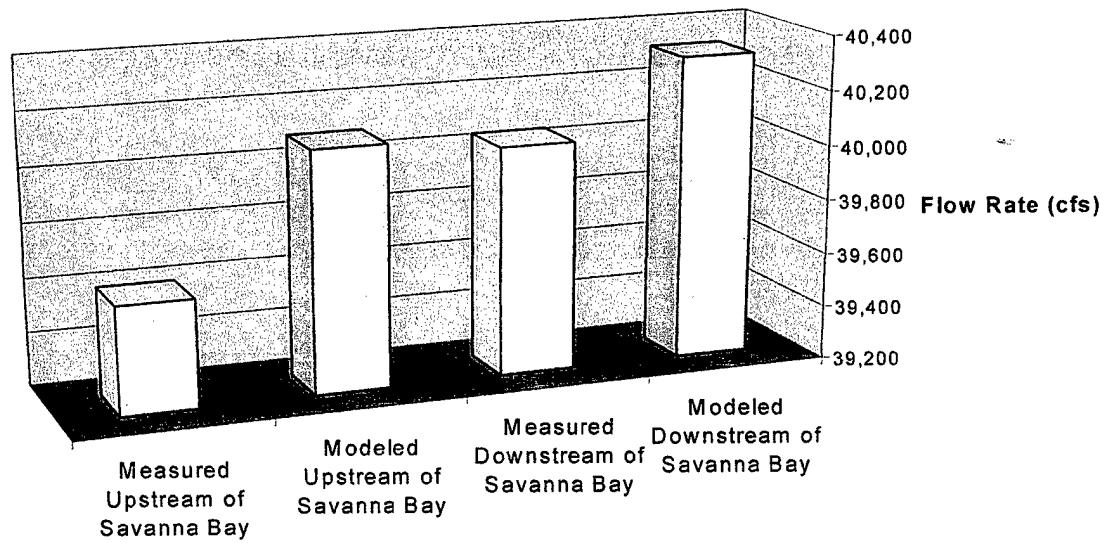




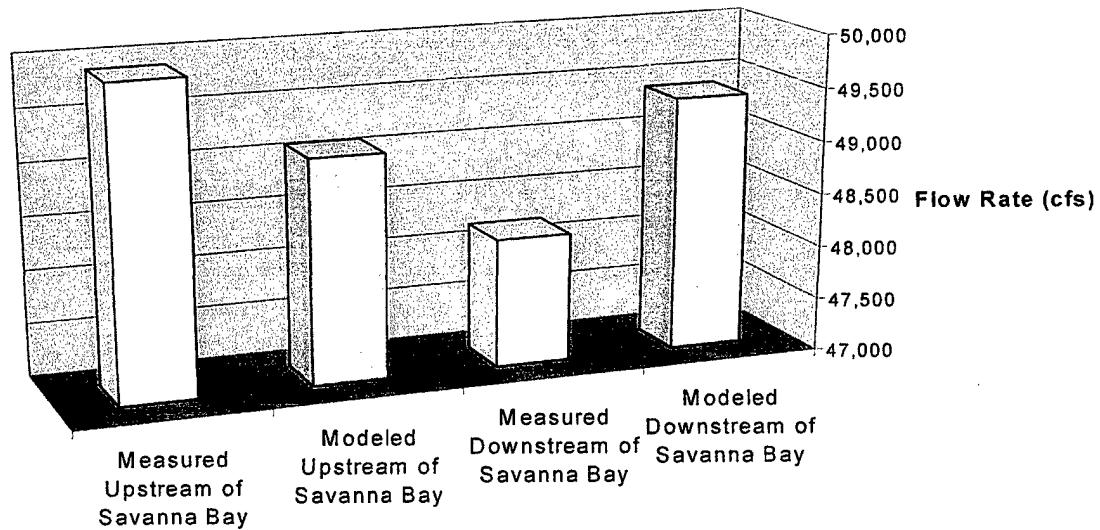


	<p><b>U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS</b></p>
PREPARED BY: T. Krikeng CHECKED BY: R. Davkroy	Navigation Improvement Study of the Upper Mississippi River Near Savanna Bay, Pool 13  <u>Finite Element Grid, SMS Model</u>
	PLATE NO. <b>36</b>

**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 40,000 cfs

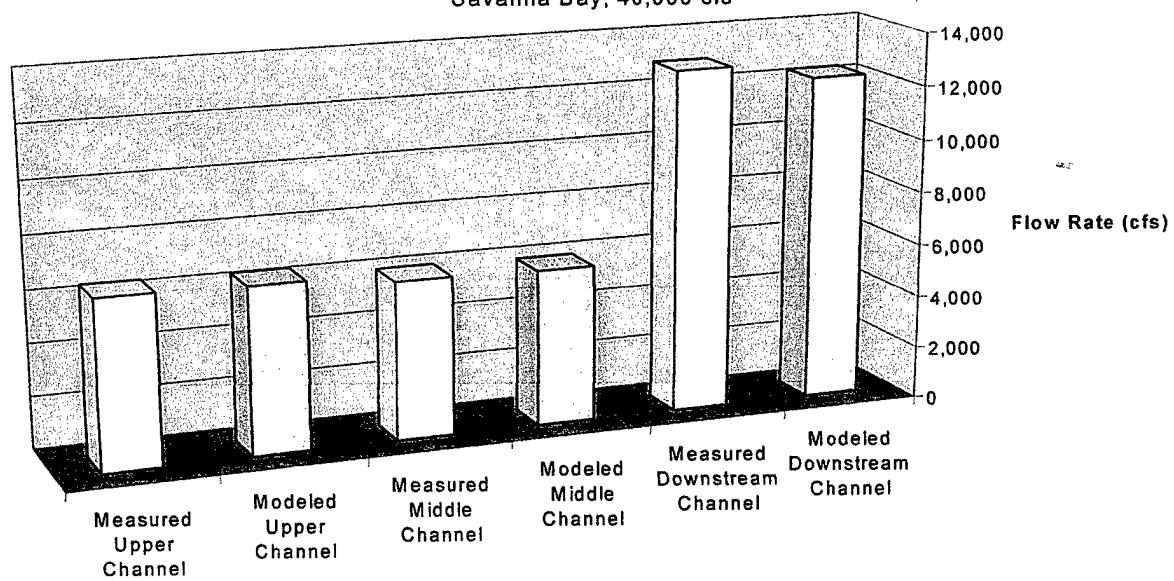


**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 49,000 cfs

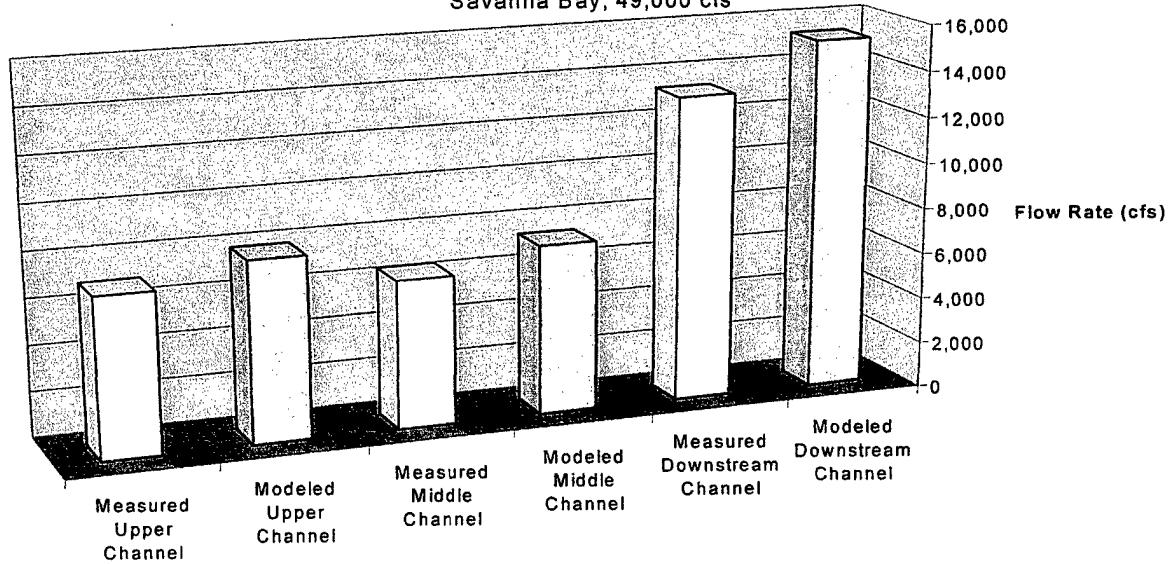


 <small>PREPARED BY: T. Kirkeng CHECKED BY: R. Davinoy</small>	<b>U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS</b>	
	<small>Navigation Improvement Study of the Upper Mississippi River Near Savanna Bay, Pool 13</small>	<u>Main Channel</u> <u>Measured Flow vs. SMS Modeling Results</u>
		<small>PLATE NO.</small>
		<b>37</b>

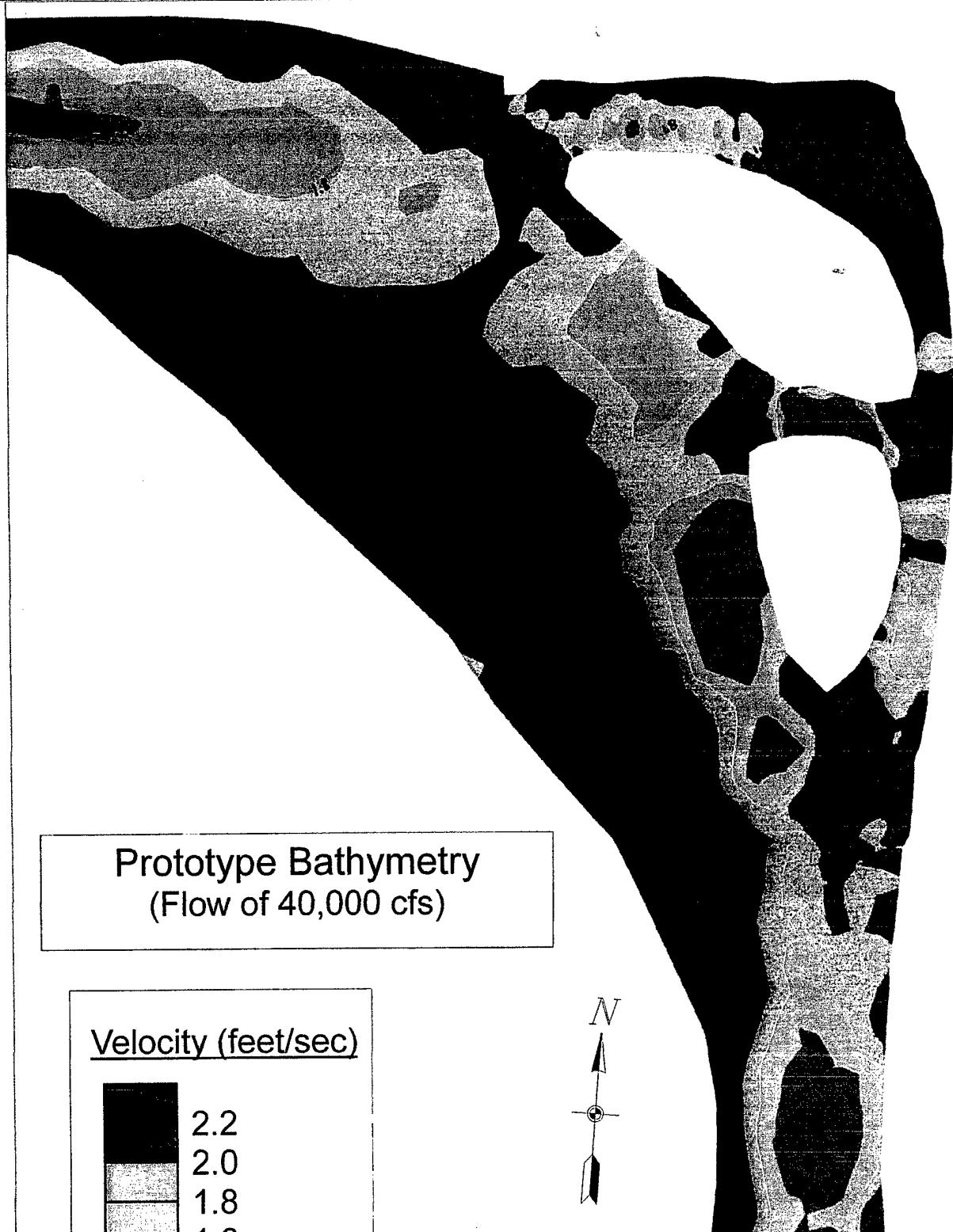
**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 40,000 cfs



**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 49,000 cfs



 <small>PREPARED BY: T. Kiskeeng CHECKED BY: R. Davyey</small>	<b>U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS</b>	
	<small>Navigation Improvement Study of the Upper Mississippi River Near Savanna Bay, Pool 13</small>	
<u><b>Side Channel Openings</b></u> <u><b>Measured Flow vs. SMS Modeling Results</b></u>		<small>PLATE NO.</small> <b>38</b>



Prototype Bathymetry  
(Flow of 40,000 cfs)

Velocity (feet/sec)



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ROCK ISLAND, ILLINOIS

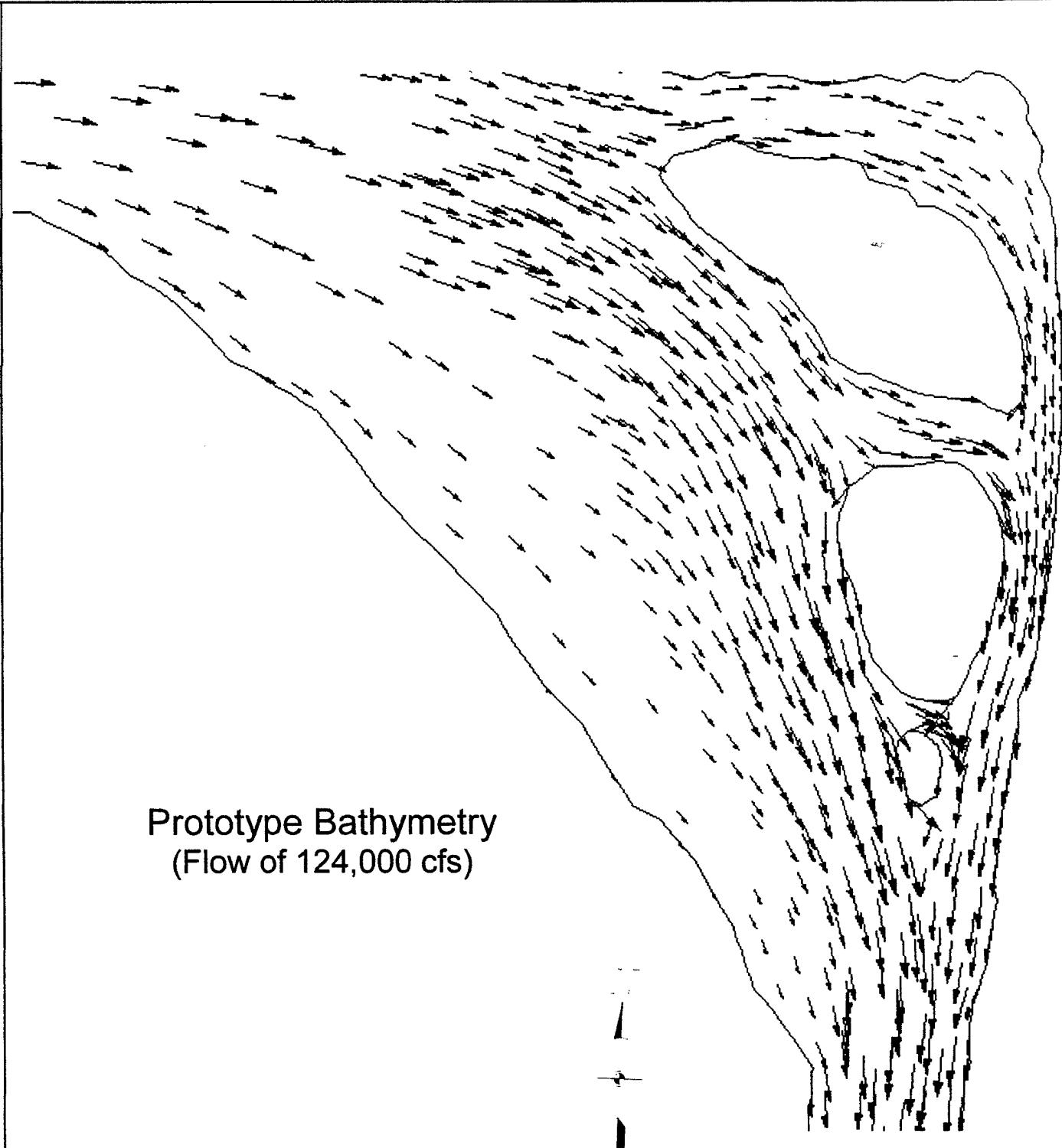
PREPARED BY: T. Kikeeng  
CHECKED BY: R. Davinroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth Averaged Velocity Contours,  
SMS Model

PLATE NO.

**39**



Prototype Bathymetry  
(Flow of 124,000 cfs)

Vector Velocity Scale:  
→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

PREPARED BY: T. Krkeeng  
CHECKED BY: R. Davydyk

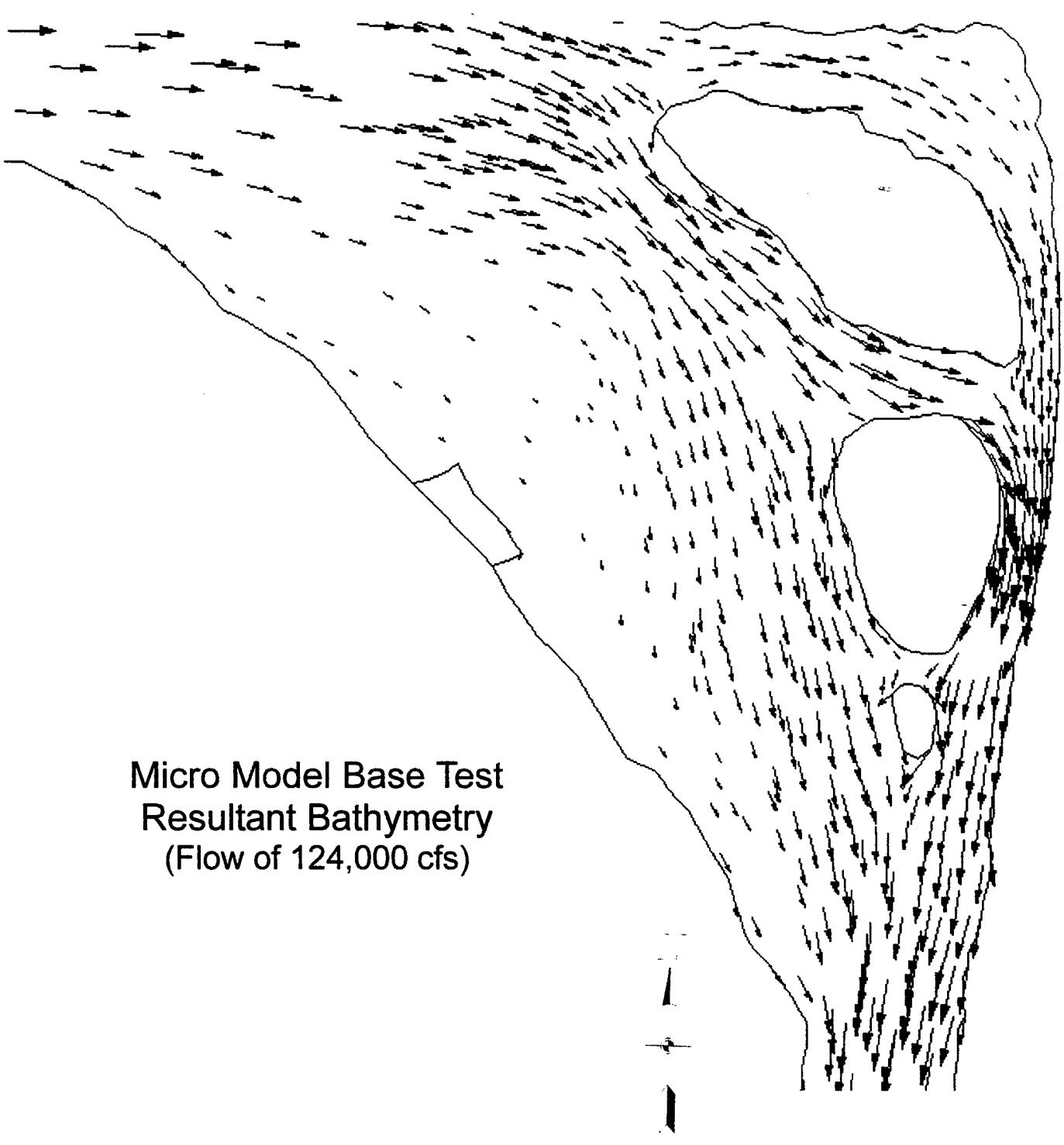
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors.  
SMS Model

PLATE NO

40

Micro Model Base Test  
Resultant Bathymetry  
(Flow of 124,000 cfs)



Vector Velocity Scale:  
→  
5 feet/sec



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CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

PREPARED BY: T. Krikken  
CHECKED BY: R. Devroye

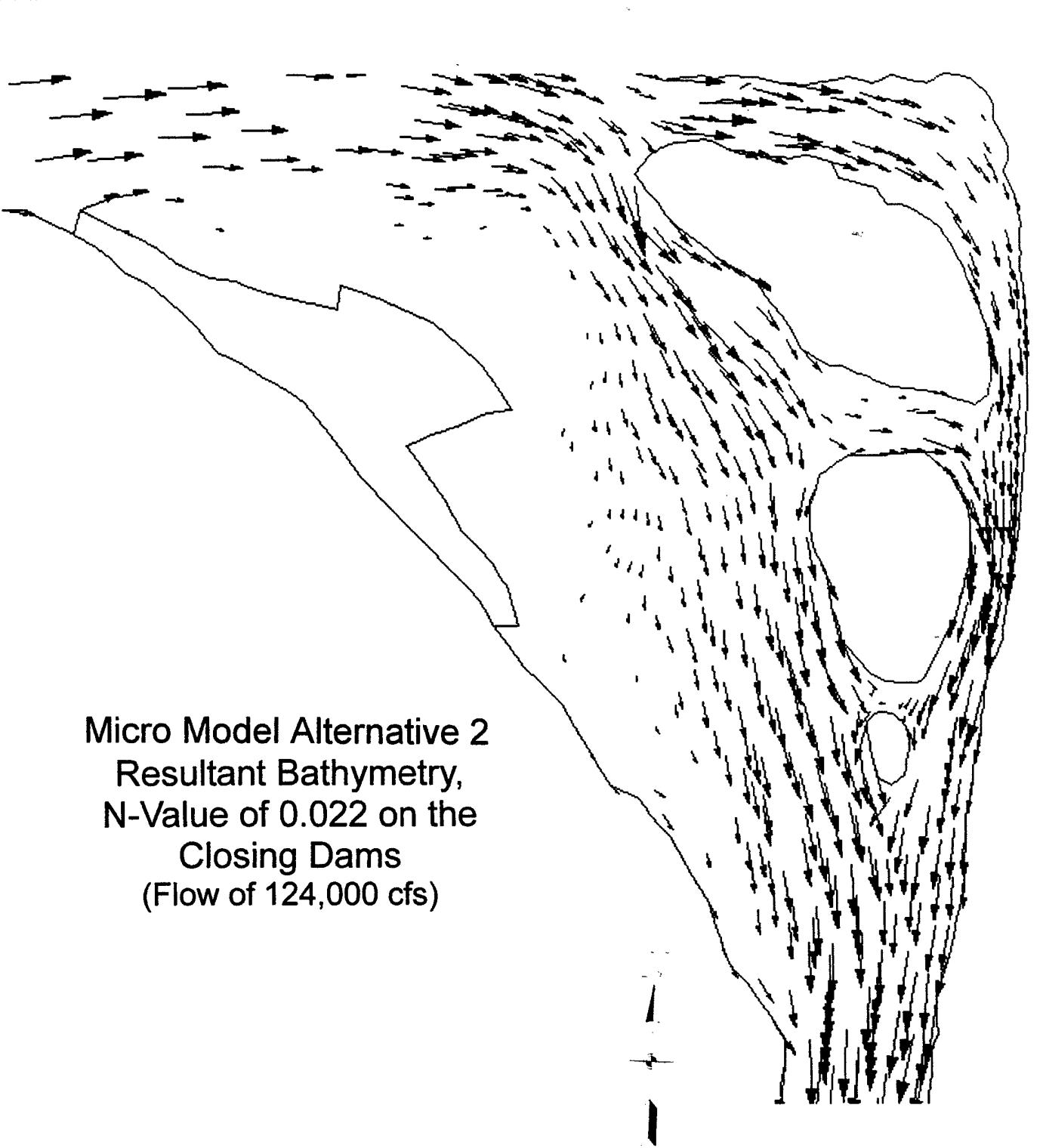
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

41

Micro Model Alternative 2  
Resultant Bathymetry,  
N-Value of 0.022 on the  
Closing Dams  
(Flow of 124,000 cfs)



Vector Velocity Scale:  
→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

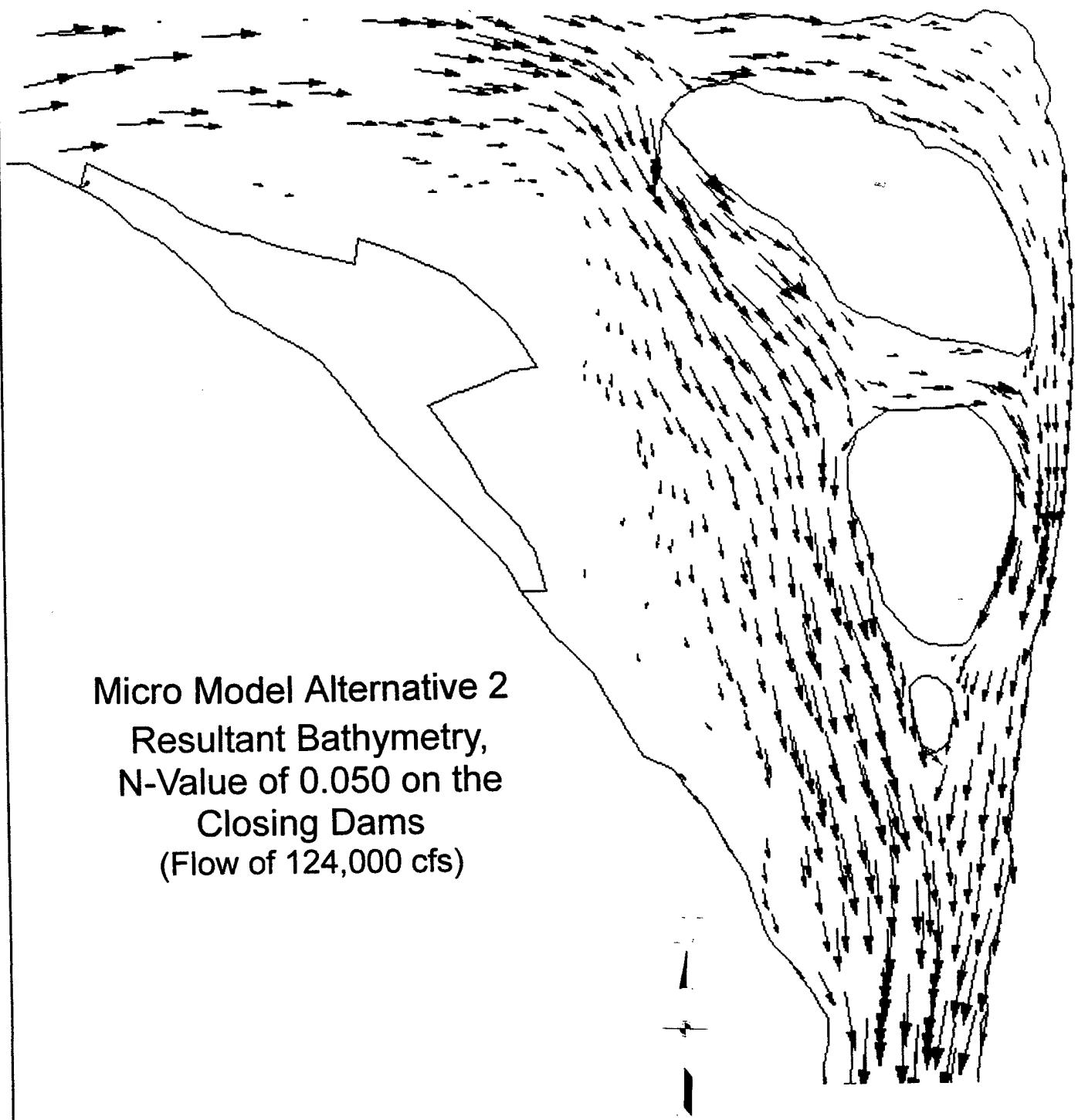
PREPARED BY: T. Krikeng  
CHECKED BY: R. Denney

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

42



**Micro Model Alternative 2**  
**Resultant Bathymetry,**  
**N-Value of 0.050 on the**  
**Closing Dams**  
**(Flow of 124,000 cfs)**

Vector Velocity Scale:  
5 feet/sec



**U.S ARMY ENGINEER DISTRICT, ROCK ISLAND**  
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**ROCK ISLAND, ILLINOIS**

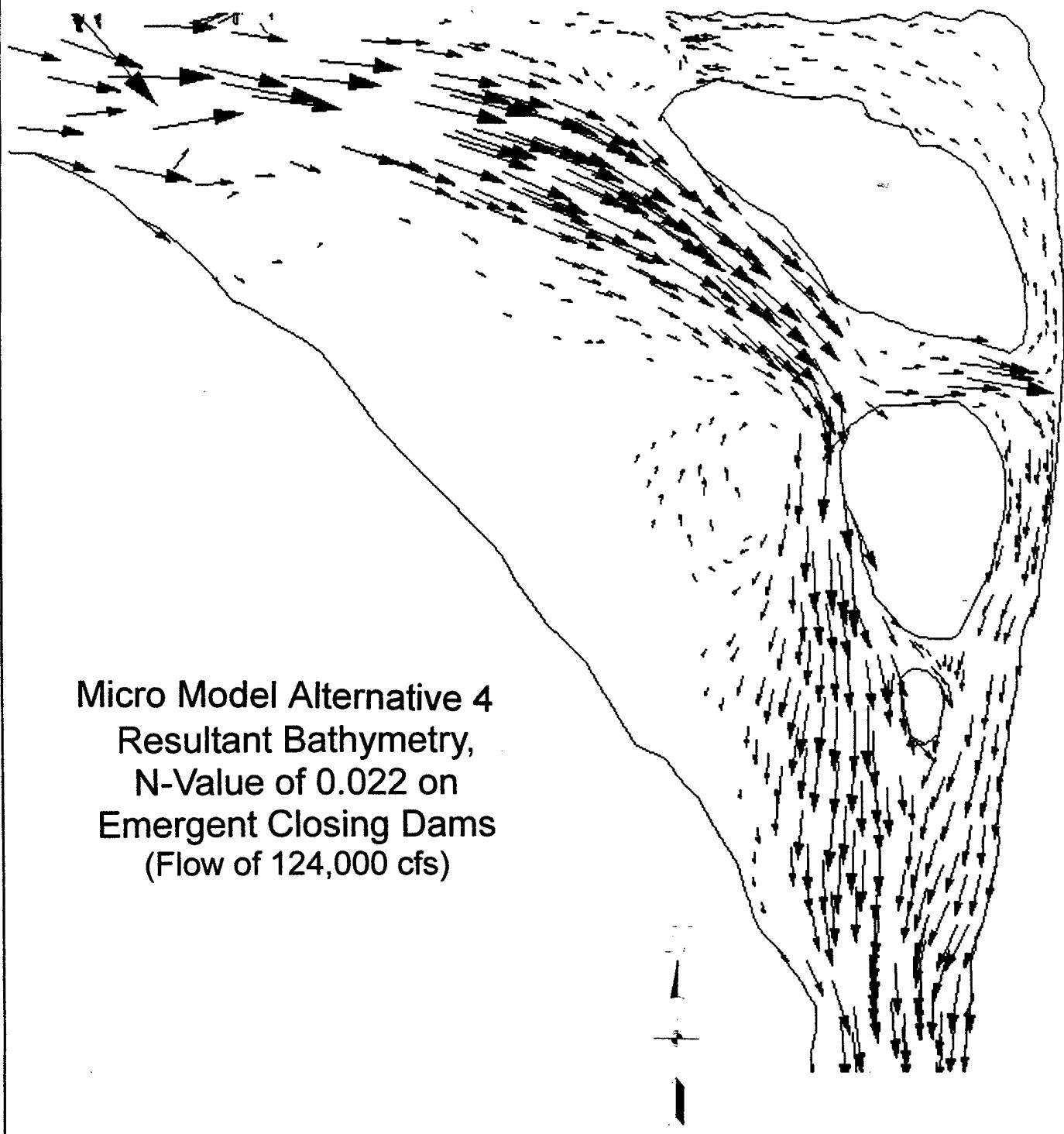
PREPARED BY: T. Krueger  
CHECKED BY: R. Devroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

**43**



Micro Model Alternative 4  
Resultant Bathymetry,  
N-Value of 0.022 on  
Emergent Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:  
→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

PREPARED BY: T. Krikeng  
CHECKED BY: R. Devorey

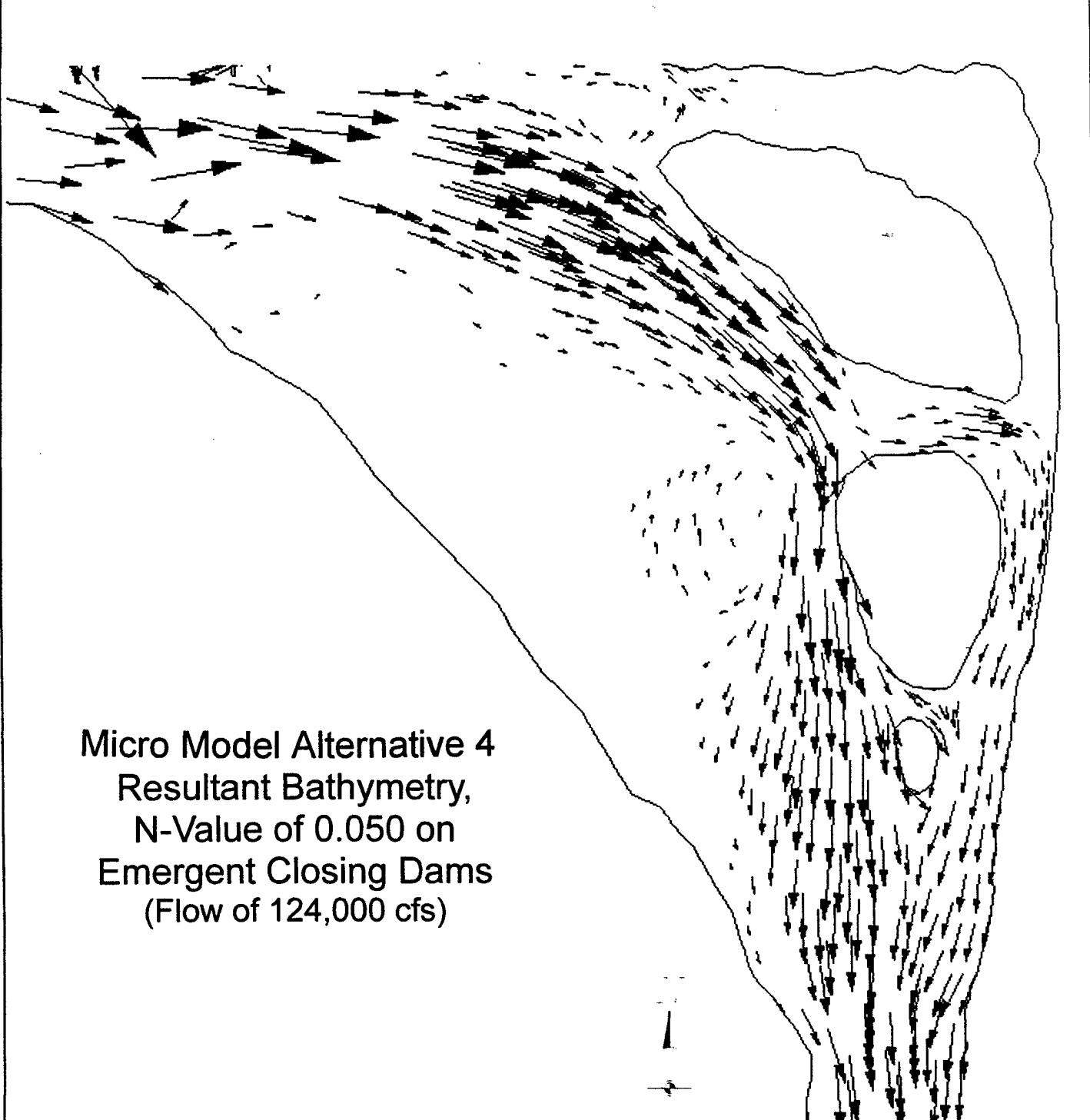
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors.  
SMS Model

PLATE NO.

44

**Micro Model Alternative 4**  
**Resultant Bathymetry,**  
**N-Value of 0.050 on**  
**Emergent Closing Dams**  
**(Flow of 124,000 cfs)**



Vector Velocity Scale:  
→  
5 feet/sec



**U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

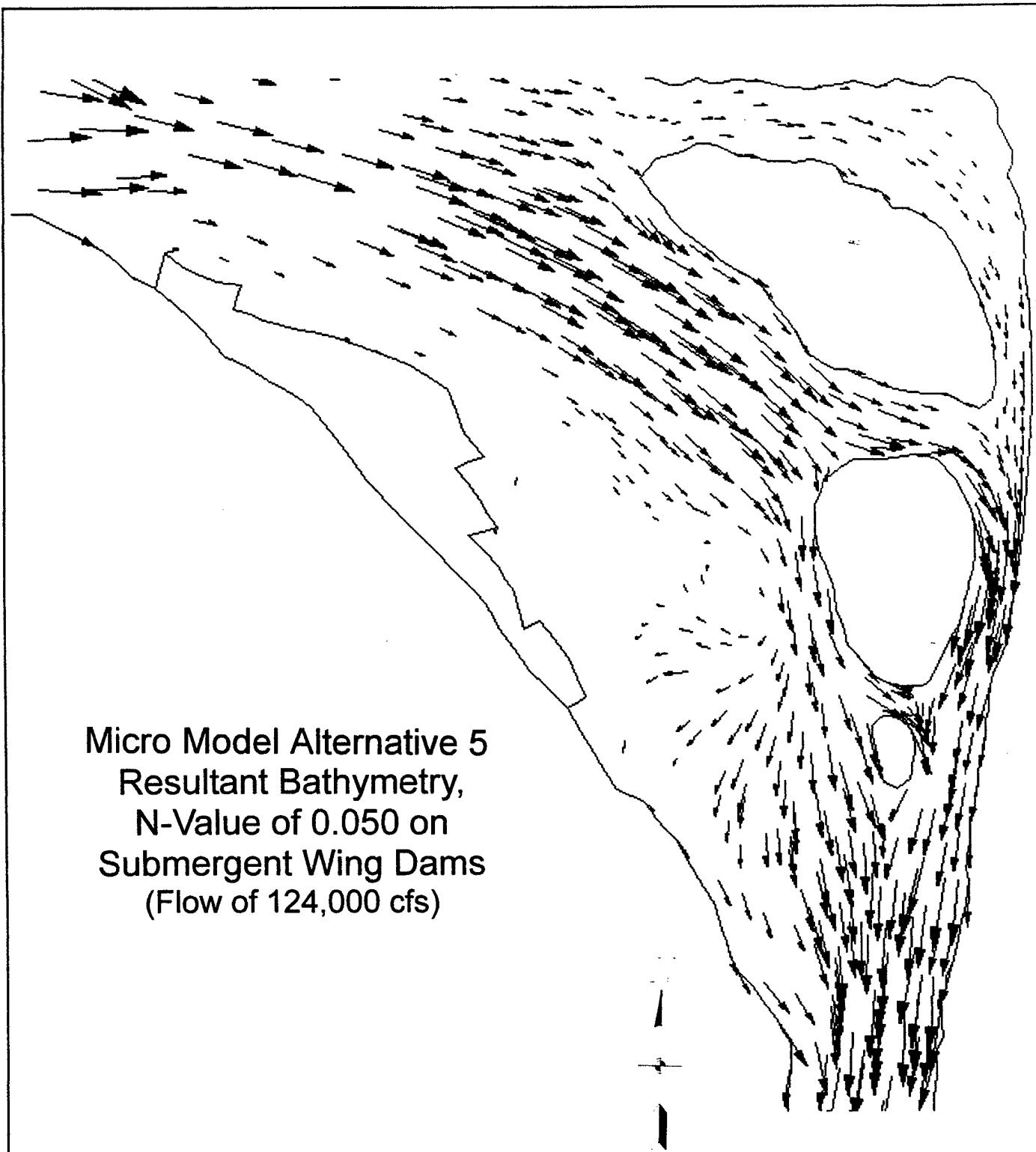
PREPARED BY: T. Krikeng  
CHECKED BY: R. Dewey

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**45**



Micro Model Alternative 5  
Resultant Bathymetry,  
N-Value of 0.050 on  
Submergent Wing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:  
→  
5 feet/sec



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CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

PREPARED BY: T. Kukreeng  
CHECKED BY: R. Devroye

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

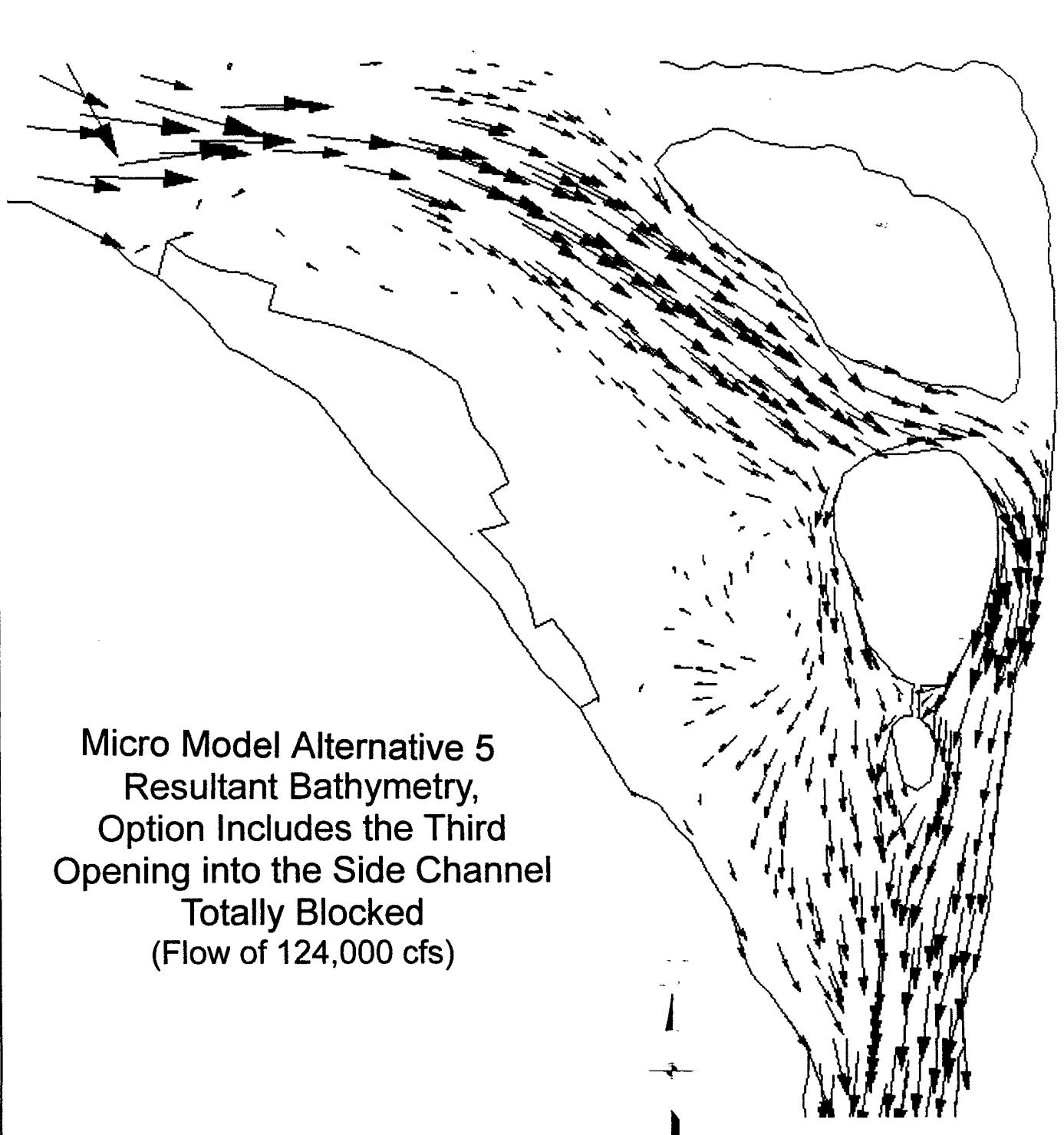
Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

46

6

Micro Model Alternative 5  
Resultant Bathymetry,  
Option Includes the Third  
Opening into the Side Channel  
Totally Blocked  
(Flow of 124,000 cfs)



Vector Velocity Scale:  
→  
5 feet/sec



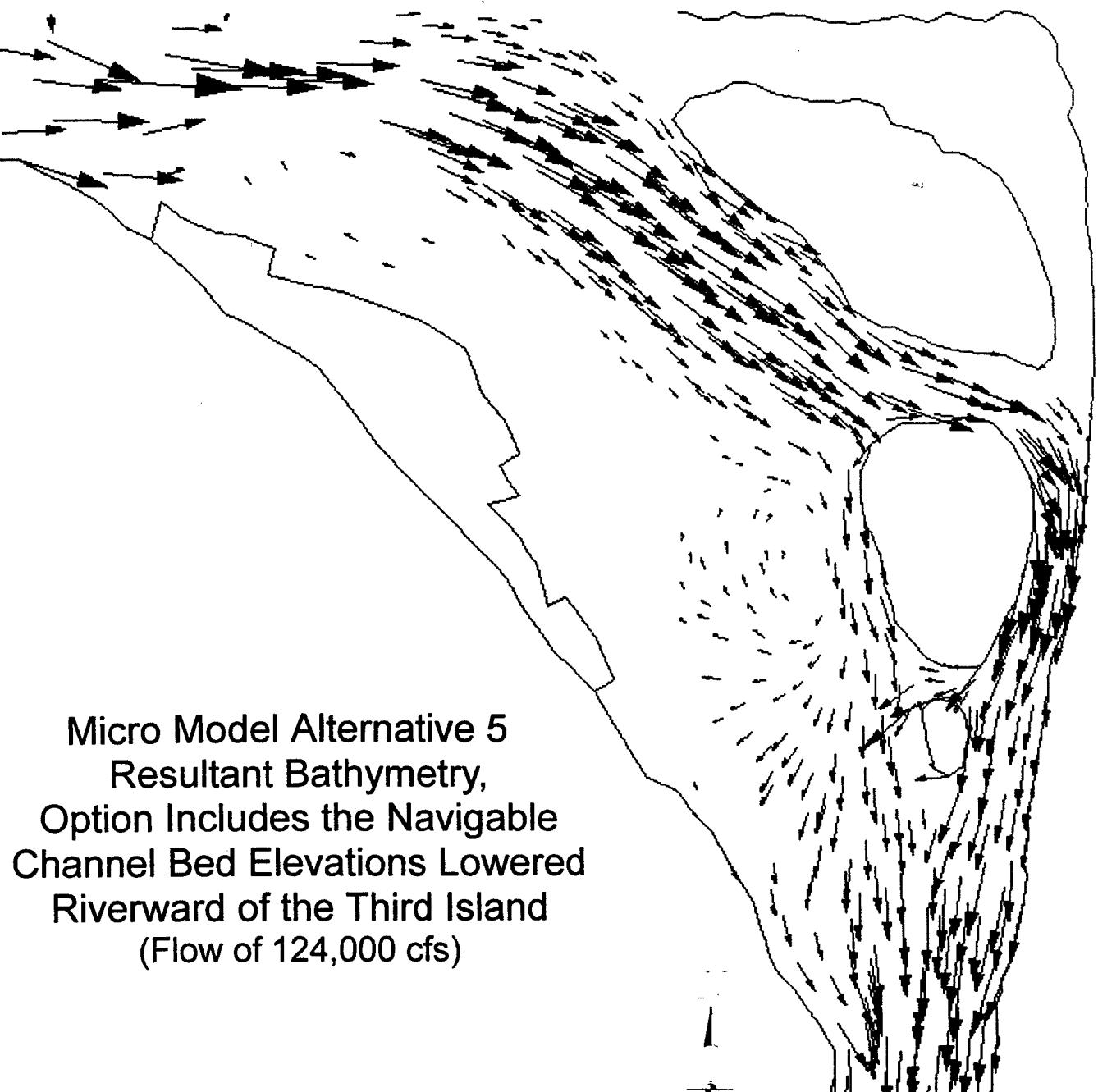
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

PREPARED BY: T. Kakeeng  
CHECKED BY: R. Daway

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.



**Micro Model Alternative 5**  
**Resultant Bathymetry,**  
**Option Includes the Navigable**  
**Channel Bed Elevations Lowered**  
**Riverward of the Third Island**  
**(Flow of 124,000 cfs)**

Vector Velocity Scale:  
→  
5 feet/sec



**U.S ARMY ENGINEER DISTRICT, ROCK ISLAND**  
**CORPS OF ENGINEERS**  
**ROCK ISLAND, ILLINOIS**

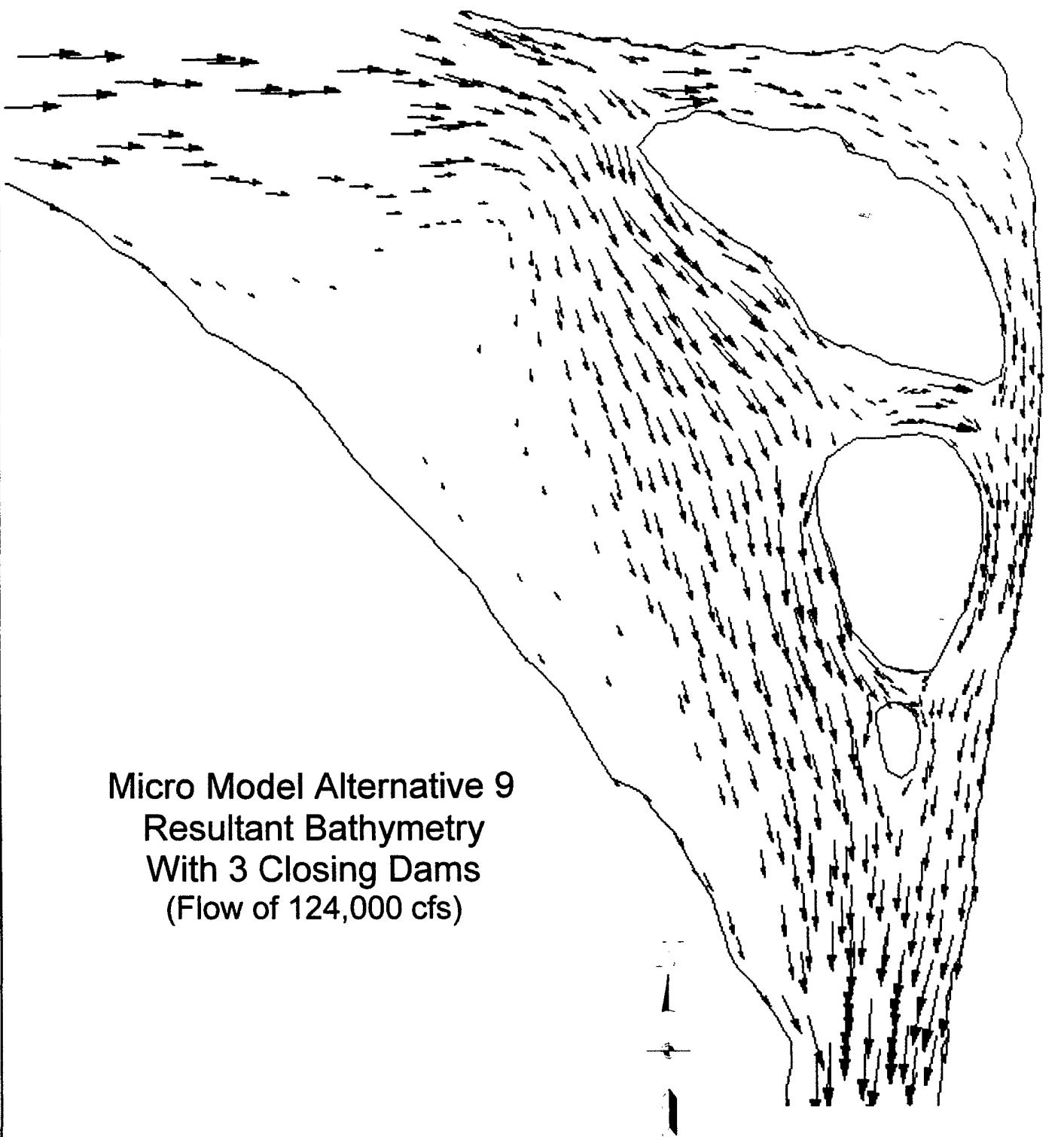
PREPARED BY: T. Krueger  
CHECKED BY: R. Devroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

**Micro Model Alternative 9  
Resultant Bathymetry  
With 3 Closing Dams  
(Flow of 124,000 cfs)**



**Vector Velocity Scale:**  
→  
5 feet/sec



**U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS**

PREPARED BY: T. Kiteeng  
CHECKED BY: R. Devroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model!

PLATE NO.